



## *Education*

Ph.D.	Mechanical Engineering	Stanford University, 1997
M.S.	Mechanical Engineering	Stanford University, 1991
B.S. <i>cum laude</i>	Mechanical Engineering	Howard University, 1989

## *Professional Service, Honors & Affiliations*

Co-Chair, Papers Program, Platform for Advanced Scientific Computing Conference, 2021.  
Editor, *ACM SIGPLAN Fortran Forum*, 2020-present  
Better Scientific Software Fellowship, U.S. Dept. of Energy Exascale Computing Program 2020-'21.  
Advisory Board Member, Center for Research Software, University of Alabama, 2018-present.  
Co-Editor, Software Engineering Track, *Computers in Science and Engineering*, 2015-present.  
Advisory Board Member, Sustainable Horizons Institute, 2014-present.  
Editorial Board Member, *Scientific Programming*, 2014-2017.  
Associate Editor, *Scientific Programming*, 2012-2104.  
Alternate, J3 Fortran standards committee, 2012-present.  
Technical Advisor, Numerical Algorithms Group Ltd., 2013-2019.  
Chair, Broader Engagement Workshop, Supercomputing 2013.  
Member, Organizing Committee, 5<sup>th</sup> Intl. Workshop on Software Engineering for Computational Science & Engineering, 2013  
Member, Scientific Committee, VECPAR 2012 (10<sup>th</sup> Intl. Mtg. on Vector & Parallel Computing).  
Top 20 Most Downloaded Article, Feb.–Mar., *Physics of Fluids*, 2008.  
Cover image, *Physics of Fluids*, Feb. 2008.  
Alumni Volunteer Award, Howard University Alumni Association, 2004.  
NASA Faculty Fellowship, 2003, 2004  
NAFEO Faculty Fellowship, 2004  
Alumni Board member-at-large, Howard University, 2003-'04  
Alumni Excellence Award, Howard University CEACS Alumni Network, 2003  
Registered Professional Engineer in the State of California, (Certificate No. M 31108), since 1999  
Star Award, Exponent, Inc., 1997  
National Science Foundation Minority Graduate Fellowship, 1991-'94  
National Consortium for Educational Access Fellowship, 1990-'91  
GEM Fellowship, 1989-'90  
Tau Beta Pi Fellowship, National Engineering Honor Society, 1989-'90  
U.S. Environmental Protection Agency Minority Student Fellowship, 1987-'88, 1988-'89  
Best Editorial, Engineering College Magazines Associated, 1987  
Best Non-Technical Article, Engineering College Magazines Associated, 1987

## *Books*

Rouson, D.W.I., S. Filippone, and S. Shende (in contract) *Modern Fortran: Software Engineering for Scientists*, CRC Press.

Rouson, D.W.I., J. Xia, J. and X. Xu (2011) *Scientific Software Design: The Object-Oriented Way*, Cambridge University Press.

## *Book Chapters and Edited Volumes*

Evans, K. J., D. Rouson, A. Salinger, M. Taylor, W. Weijer, and J. White (2009) "A scalable and adaptable solution framework within components of the Community Climate System Model," *Lecture Notes in Computer Science* **5545**:3323-349.

Rouson, D.W.I., guest editor, (2008) *Scientific Programming*, special issue on complexity in high-performance computing, v. 16, n. 1.

Zannetti, P. Elliot, S. and Rouson, D.W.I., eds. (2007) *Environmental Sciences and Environmental Computing Vol. III*, Envirocomp Institute, Inc.

Rouson, D.W.I. and Handler, R. (2007) “Towards a variational multiscale large-eddy simulation of the atmospheric boundary layer,” *Environmental Sciences and Environmental Computing Vol. III*, Envirocomp Institute, Inc.

### *Patents*

Morris, K., Xia, J., and Rouson, D. W. I. System and method for reference counting with user-defined structure constructors, U.S. patent application 13/197,118, Filed 3 August 2011, Issued: 23 February 2012.

Rouson, D. W. I. Dynamic memory management system and method, U.S. Patent 8010943, Filed July 2007, Issued 30 August 2011.

### *Refereed Journal Articles and Conference Papers*

Rasmussen, S., Gutman, E.D., Friesen, B., Rouson, D., Filippone, S., Moulitsas, I. (2018). Development and performance comparison of MPI and Fortran Coarrays within an atmospheric research model. In *Proceedings of PAW-ATM 18: Parallel Applications Workshop, Alternatives to MPI.*, November 16.

Rouson, D., McCreight, J.L. and Fanfarillo, A. (2017). Incremental caffeination of a terrestrial hydrological modeling framework using Fortran 2018 teams. In *Proceedings of the Second Annual PGAS Applications Workshop*, November 13.

Rouson, D., Gutmann, E.D., Fanfarillo, A. and Friesen, B. (2017) Performance portability of an intermediate-complexity atmospheric research model in coarray Fortran. In *Proceedings of the Second Annual PGAS Applications Workshop* (p. 4) Denver, Colorado, USA, November 13.

Leatongkam, A., Nanthaamornphong, A., and Rouson, D. (2017) Generating Sequence Diagrams for Modern Fortran, *2017 International Workshop on Software Engineering for Science*, Buenos Aires, Argentina, May 22.

Haveraaen, H., K. Morris, D. Rouson, H. Radhakrishnan, and C. Carson (2015) “High-Performance Design Patterns for Modern Fortran,” *Scientific Programming*, Article ID 942059, 14 pages,. doi:10.1155/2015/942059.

Radhakrishnan, H. D. W. I. Rouson, K. Morris, S. Shende, and S. C. Kassinos (2015) “Using Coarrays to Parallelize Legacy Fortran Applications: Strategy and Case Study,” *Scientific Programming*, Article ID 904983, 12 pages, 2015. doi:10.1155/2015/904983.

Cardellini, V., Fanfarillo, A., Filippone, S., and Rouson, D. (2015) Hybrid Coarrays: a PGAS Feature for Many-Core Architectures, *International Conference on Parallel Computing (ParCo) 2015*, Edinburgh, UK, September 1-4.

- Nanthaamorphong, A., J. Carver, K. Morris, H. Michelsen, and D. W. I. Rouson. (2014) "Building CLiiME via Test-Driven Development: A Case Study," *Computing in Science and Engineering*, May/June, 16:3, 36-46.
- Cardellini, V., Filippone, S. and Rouson, D. W. I. (2014) "Design patterns for sparse-matrix computations on hybrid CPU/GPU platforms," *Scientific Programming*, 22:1, 1-19.
- Fanfarillo, A., Burnus, T., Filippone, S., Cardellini, V., Nagle, D., and Rouson, D. W. I. (2014) OpenCoarrays: open-source transport layers supporting coarray Fortran compilers, *8th Intl. Conf. on Partitioned Global Address Space Programming Models*, Eugene, Oregon, USA, October 6-10.
- Clune, T., M. Rilee and D. Rouson (2014): Testing as an Essential Process for Developing and Maintaining Scientific Software, 2nd Workshop on Sustainable Software for Science: Practices and Experiences (WSSSPE2), 2014 November 16, New Orleans, Louisiana, USA. (<http://dx.doi.org/10.6084/m9.figshare.1112520>).
- Haveraaen, M., K. Morris, and D. W. I. Rouson (2013) "High-performance design patterns for modern Fortran," *First International Workshop on Software Engineering for High Performance Computing in Computational Science and Engineering*, Denver, Colorado, USA. November 22.
- Radhakrishnan, H., D. W. I. Rouson, K. Morris, S. Shende, and S. C. Kassinis (2013) "Test-driven coarray parallelization of a legacy Fortran application," *First International Workshop on Software Engineering High Performance Computing in Computational Science and Engineering*, Denver, Colorado, USA. November 22.
- Nanthaamornphong, A., K. Morris, D. W. I. Rouson, and H. A. Michelsen, (2013) "A Case Study: Agile Development in the Community Laser-Induced Incandescence Modeling Environment (CLiiME)," *2013 International Workshop on Software Engineering for Computational Science and Engineering*, San Francisco, California USA. May 18.
- Davide Barbieri, Valeria Cardellini, Salvatore Filippone, and Damian Rouson (2012) "Design Patterns for Scientific Computations on Sparse Matrices," in M. Alexander et al. (Eds.): *Euro-Par 2011 Workshops, Part I*, LNCS 7155, pp. 367--376. Springer, Heidelberg.
- Morris, K., Rouson, D. W. I., Lemaster, and Filippone, S. (2012) "Exploring capabilities within ForTrilinos by solving the 3D Burgers equation," *Scientific Programming* **20**:3, 275-292.
- Rouson, D. W. I., K. Morris. and J. Xia (2012) "Managing C++ objects with Fortran in the driver's seat: This is not your parents' Fortran," *Computing in Science and Engineering* **14**:2, 46-54.
- Xu, X., Rouson, D. W. I., Kassinis, S. C. and Radhakrishnan, H. (2012) "Dispersed-phase structure in sheared MHD turbulence," *Journal of Turbulence* **13**:2, 1-24.
- Morris, K., Handler, R. and Rouson, D. W. I. (2011) "Intermittency in the turbulent Ekman layer," *Journal of Turbulence*, **12**:12, 1-25.
- Morris, K., D. W. I. Rouson, and J. Xia (2011) "On the object-oriented design of reference-counted shadow objects in Fortran 2003," *Fourth International Workshop on Software Engineering for Computational Science and Engineering*, Honolulu, Hawaii USA. May 28.
- Rouson, D. W. I., Xia, J. and Adalsteinsson, H. (2010) "Design patterns for multiphysics modeling in Fortran 2003 and C++," *ACM Transactions on Mathematical Software* v. 37, n. 1.
- Rouson, D. W. I., J. Xia and X. Xu, (2010) "Object construction and destruction design patterns in

Fortran 2003,” *International Conference on Computational Science 2010*, Amsterdam, Netherlands, May 31–June 2.

Akylas, E.E., S. C. Kassinos, D. W. I. Rouson, and X. Xu, (2009) "Accelerating stationarity in linearly forced isotropic turbulence," *The Sixth International Symposium on Turbulence and Shear Flow Phenomena*, Seoul, Korea, June 22-24.

Rouson, D.W.I. (2008) “Towards analysis-driven scientific software architecture: The case for abstract data type calculus”, *Scientific Programming*, v. 16, n. 4.

Morris, K., Koplik, J., and Rouson, D. W. I. (2008) “Vortex locking in direct numerical simulations of quantum turbulence,” *Physical Review Letters* **101**, 015301.

Rouson, D.W.I., Kassinos, S. C., Moulitsas, I., Sarris, I. and Xu, X. “Dispersed-phase structural anisotropy in homogeneous magnetohydrodynamic turbulence at low magnetic Reynolds number,” *Physics of Fluids* **20**, 025101 (2008).

Rouson, D.W.I., Rosenberg, R., Xu, X., Moulitsa, I. and Kassinos, S.C. (2008) “A grid-free abstraction of the Navier-Stokes equations in Fortran 95/2003,” *ACM Transactions on Mathematical Software*, **34**:1.

Rouson, D.W.I., Xu, X. and Morris, K. (2006) “Formal constraints on memory management for composite overloaded operations,” *Scientific Programming*, **14**:1, 27-40.

Rouson, D.W.I, Morris, K. and Xu, X. (2005) “Dynamic memory de-allocation in Fortran 95/2003 derived type calculus”, *Scientific Programming* , **13**:3, 189-203.

Rouson, D.W.I and Xiong, Y. (2004). “Design metrics in quantum turbulence simulations: how physics influences software architecture”, *Scientific Programming* , **12**:3, pp. 185-1986.

[J1] Rouson, D. W. I. & Eaton, J. K. (2001) “On the preferential concentration of solid particles in turbulent channel flow,” *Journal of Fluid Mechanics*, **428**, 149-169.

### *Invited Keynote & Plenary Lectures*

“Design patterns for multiphysics modeling in Fortran 2003 and C++,” CBC Workshop on High-Performance Computing and Biomedical Flows, Simula Research Laboratory, Oslo, Norway, May 19-21, 2008.

“Can Scalable Development Lead to Scalable Execution?” Workshop on Petascale Computing: Its Impact on Geophysical Modeling and Simulation, NCAR Mesa Laboratory, Boulder, Colorado, May 5-7, 2008.

“Forensic tools for fire investigation,” Natural Gas Claims & Litigation Association Conference, San Diego, CA, April 2006.

### *Posters & Other Publications*

Abell, D. T., Moeller, P., Nagler, R., Nash, B., Pogorelov, I.V., Méot, F., Beekman, I. B., and Rouson, D. W. I. (2019). Zgoubi Status: Improved Performance, Features, and Graphical Interface. *10<sup>th</sup> International Particle Accelerator Conference*, May.

Fanfarillo, A. and D. Rouson (2015) "Leveraging OpenCoarrays to Support Coarray Fortran on IBM Power8E." *ACM SIGPLAN Fortran Forum*. Vol. 34. No. 2. ACM, 2015.

- Rouson, D. W. I., K. Morris, M. Haverlaen, S. Shende, and J. Xia (2013) "High-performance design patterns in modern Fortran," *International Conference for High Performance Computing, Networking, Storage, and Analysis*, Denver, Colorado, USA, November 14-17.
- Rouson, D. W. I., H. Radhadrishnan, K. Morris, S. Shende, and S. C. Kassinos (2013) "Test-driven parallelization of a legacy Fortran program," *International Conference for High Performance Computing, Networking, Storage, and Analysis*, Denver, Colorado, USA, November 14-17.
- Rouson, D. W. I. "Puppeteer," ParaPLOP 2009 Workshop on Parallel Programming Patterns, Santa Cruz, CA Jun. 4-5, 2009.
- Rouson, D.W.I., Xu, X. and K. Morris, "Morfeus: A Pattern-Based Multiphysics Framework in Fortran 2003," SIAM Computational Science & Engineering Conf., Miami, FL, Mar. 1-6, 2009.
- Evans, K. J., Rouson, D., Salinger, A., Taylor, M., White, J. B., and Drake, J. B., "A fully implicit solution method capability in CAM-HOMME," DOE Applied Mathematics Principal Investigators Meeting, Argonne, IL, October 15-17, 2008.
- Evans, K. J., Rouson, D., Salinger, A., Taylor, M., White, J. B., and Drake, J. B., "Fully implicit solver in HOMME," Community Climate System Model Workshop, Breckenridge, Colorado, Jun. 17, 2008.
- Xu, X., Rouson, D.W.I., and Knaepen, B. "A variational multiscale large-eddy simulation of isotropic turbulence at low magnetic Reynolds number," *Proc. of the 2007 MHD Summer Program*, University of Belgium, Brussels, Belgium, 2007.
- Rouson, D.W.I., Kassinos, S., Sarris, I. and Toschi, F. "Particle dispersion in magnetohydrodynamic turbulence at low magnetic Reynolds number", to appear in *Proc. of the 2006 Summer Program, Center for Turbulence Research*, Stanford University, Stanford, CA 94305, 2006.
- Ananth, R., Ndubizu, C.C., Rouson, D., and Williams, F.W. "Ultra fine mist suppression of a burning cylinder in cross-flow", *Advances in Fire Suppression Technologies Conference*, San Diego, CA, October 2005.
- Liang, K. M., Ma, T., Quintiere, J. G., Rouson, D. "Application of CFD Modeling to Room Fire Growth on Walls." National Institute of Standards & Technology, NIST GCR 03-849, April 2003.
- Rouson, D.W.I., Tieszen, S., Evans, G. "Modeling convection heat transfer and turbulence with fire applications: a high temperature vertical plate and a methane fire", in *Proc. of the Summer Program 2002, Center for Turbulence Research*, Stanford University, Stanford, CA 94305, January 2003.
- Rouson, D. W. I, Baum, H. R. & Quintere, J. G. "A boundary layer combustion model for coupling with large eddy simulations", *2<sup>nd</sup> Joint Mtg. of U.S. Sections of the Combustion Institute*, Oakland, CA, March 2001.
- Rouson, D. W. I. and Eaton, J. K. "Particle Interaction Models for Higher-Order Simulations of Particle-Laden Turbulence," *Third International Conference on Multiphase Flow*, Lyon, France, 1998.
- Hosokawa, S., Eaton, J. K., Abrahamson, S. C., & Rouson, D. W. I. " High-order modeling of vortex decay in the presence of solid particles," *3<sup>rd</sup> Intl. Conf. on Multiphase Flow*, Lyon, France, 1998.
- Rouson, D. W. I. *A Direct Numerical Simulation of a Particle-Laden Turbulent Channel Flow*, Ph.D. Dissertation, Stanford University, Stanford, CA, 1997.

Rouson, D. W. I. & Eaton, J. K. "Direct Numerical Simulation of turbulent channel flow with immersed particles," *3<sup>rd</sup> International Symposium on Numerical Methods in Multiphase Flow*, ASME FED-Vol. 185, p. 47, 1994.

### *Selected Presentations*

#### **Teaching (short courses on software engineering for science)**

- Tutorial, Broader Engagement Workshop, SIAM Conf. on Comp. Sci. & Eng., Mar. 1-5, online.
- U.S. Nuclear Regulatory Commission, January 5-7, 2021, online.
- University of California, Merced, November 4 and December 2, 2020, online.
- San Diego State University, November 18, 23, 2020, online.
- Autoliv Inc., August 3-5, 2020, Ogden, Utah.
- Pacific Northwest National Laboratory, July 20-24, 2020, online.
- Sourcery Institute, November 5-8, Oakland, CA, 2018.
- University of Cyprus, May 22 - June 1, Nicosia, Cyprus, 2017.
- SC16 (Int. Conf. on HPC, Networks, and Data Storage), Salt Lake City, UT, Nov. 16, 2016.
- International Conference on Supercomputing, Frankfurt, Germany, June 2016.
- National Center for Atmospheric Research, Boulder, CO, September 2016.
- Pacific Northwest National Laboratory, Richland, WA, December, 2015.
- SC15 (Int. Conf. on HPC, Networks, and Data Storage), Austin, TX, Nov. 16, 2015.
- National Center for Atmospheric Research S, Boulder, CO, August, 2015.
- Oak Ridge National Laboratory, Oak Ridge, TN, September 9-11, 2015.
- Wright Patterson Air Force Base, Ohio, January, 2015.
- SC14 (Int. Conf. on HPC, Networks, and Data Storage), New Orleans, LA, Nov. 16, 2014.
- Bettis Atomic Power Laboratory, West Mifflin, PA, September 9-11, 2014
- BP (formerly British Petroleum), Houston, TX, July 18, 2014.
- NASA Langley Research Center, Hampton, VA, April 28 – 30, 2014
- Army Research Laboratory, Aberdeen, MD, February 18-20, 2014.
- U.S. Naval Research Laboratory, Monterey, CA, January 14-16, 2014.
- NASA Langley Research Center, October 23-25, 2013.
- Knolls Atomic Power Laboratory, September 9-11, 2013.
- U.S. Naval Research Laboratory, Washington, DC, June 11-13, 2013.
- NASA Goddard Space Flight Center, March 19-21, 2013.
- Oak Ridge National Laboratory, Oak Ridge, TN, February 5-7, 2013.
- BP (formerly British Petroleum), Houston, TX, January 14-16, 2013.
- Supercomputing 2012 Conference, Salt Lake City, UT, November 11, 2012.
- National Center for Atmospheric Research S, Boulder, CO, August 7-9, 2012.
- National Energy Research Supercomputing Center, Oakland, CA, April 10-12, 2012.
- University of California, Berkeley, March 26-28, 2012.
- HECToR academic supercomputing service, Manchester, UK, October 11-13, 2011.

#### **Teaching (graduate)**

- Software Design in Modern Fortran for Scientists and Engineers, Stanford University, Fall 2013, '14, '16.
- Scientific Software Design, University of Cyprus, Fall 2006, Spring 2017.
- Introduction to Numerical Methods, CUNY, Fall, 2000, '01, '02, '03, '04
- Turbulent Flow, CUNY, Spring 2003, '04, '05

#### **Teaching (undergraduate)**

- Aircraft & Rocket Propulsion, CUNY, Spring 2004

- Thermodynamics, CUNY, Spring 2000, '02, Fall '03
- Turbomachinery Design, CUNY, Spring 2001
- Aero-thermo-fluids Laboratory, CUNY, Fall 1999

#### **Teaching (other)**

- “Forensic software for fire investigation” (1-hr, accredited by N.Y. State Bar), Wilson Elser Moskowitz Edelman & Dicker LLP, New York, New York, Jun. 2002.

#### **Expert testimony**

- *Coach v. Sealy, Inc.*, New York, NY (deposition testimony on fire cause and origin), December 2006.
- *Clifford v. Air Tractor*, Greenville, MS (trial testimony on aircraft fuel system design and flight dynamics), August 2004.
- *Rancifer v. McGarrh*, Stanford, CA (deposition testimony on fire safety practices and equipment), July 2004.
- *Turner v. Fulton*, New York, NY (deposition testimony on automobile towing coupler design), June 2001.